CALIFORNIA DEPARTMENT OF PUBLIC HEALTH
850 Marina Bay Parkway, Richmond, CA 94804

ENVIRONMENTAL MANAGEMENT BRANCH
Marine Biotoxin Monitoring Program

Monthly Marine Biotoxin Report

November 2009

Technical Report No. 09-27

INTRODUCTION:

This report provides a summary of biotoxin activity for the month of November, 2009. Ranges of toxin concentrations are provided for the paralytic shellfish poisoning (PSP) toxins and for domoic acid (DA). Estimates are also provided for the distribution and relative abundance of *Alexandrium*, the dinoflagellate that produces PSP toxins, and *Pseudo-nitzschia*, the diatom that produces domoic acid. Summary information is also provided for any quarantine or health advisory that was in effect during the reporting period.

Please note the following conventions for the phytoplankton and shellfish biotoxin distribution maps: (i) All estimates for phytoplankton relative abundance are qualitative, based on sampling effort and percent composition; (ii) All toxin data are for mussel samples, unless otherwise noted; (iii) All samples are assayed for PSP toxins; DA analyses are performed as needed (i.e., on the basis of detected blooms of the diatoms that produce DA); (iv) Please refer to the appropriate figure key for an explanation of the symbols used on the maps.

Southern California Summary:

Paralytic Shellfish Poisoning

Low numbers of *Alexandrium* were observed at most sampling locations along the San Luis Obispo coast and at Scripps Pier (San Diego County) during November (Figure 1).

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Figure 1. Distribution of toxin-producing phytoplankton in Southern California during November, 2009.

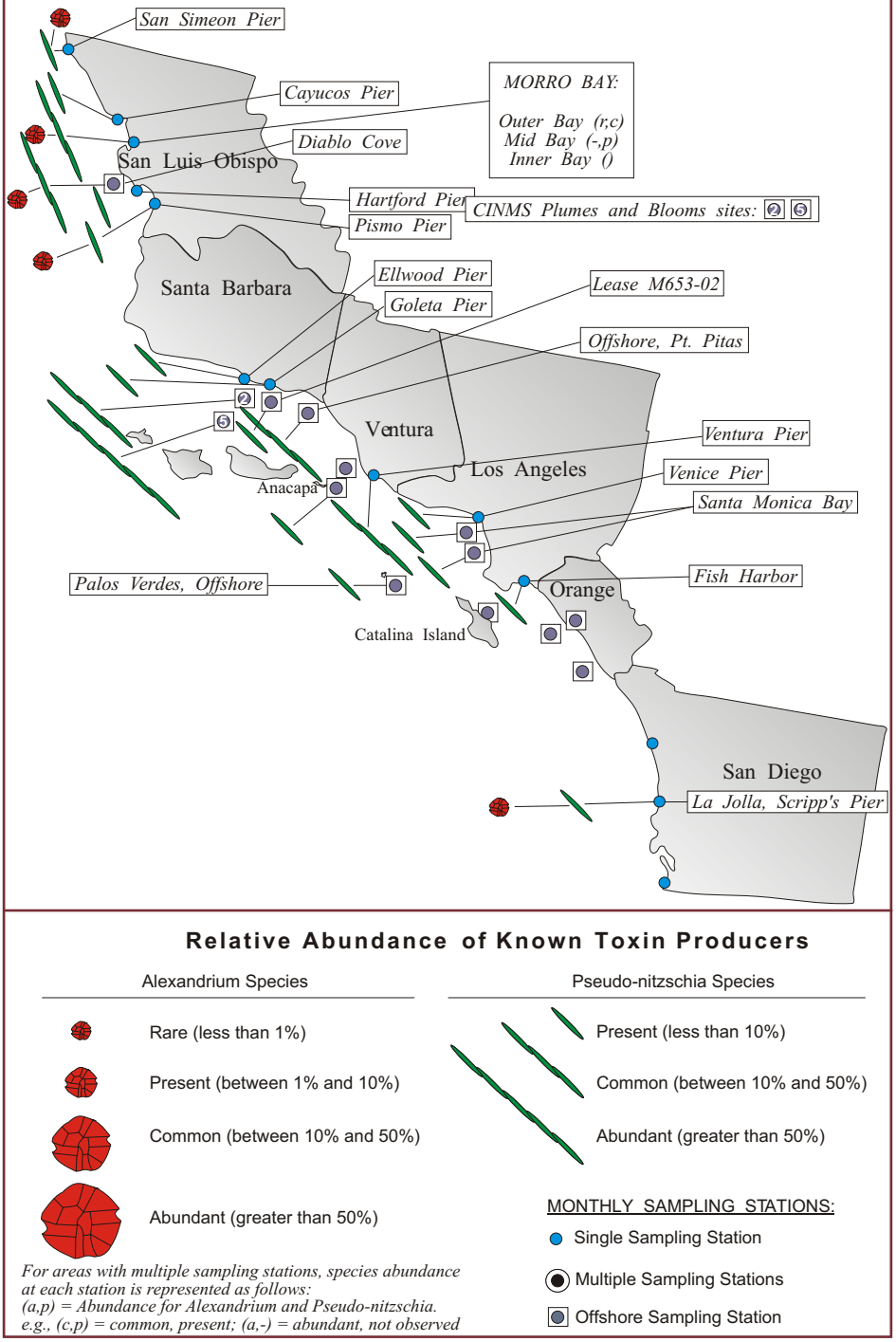
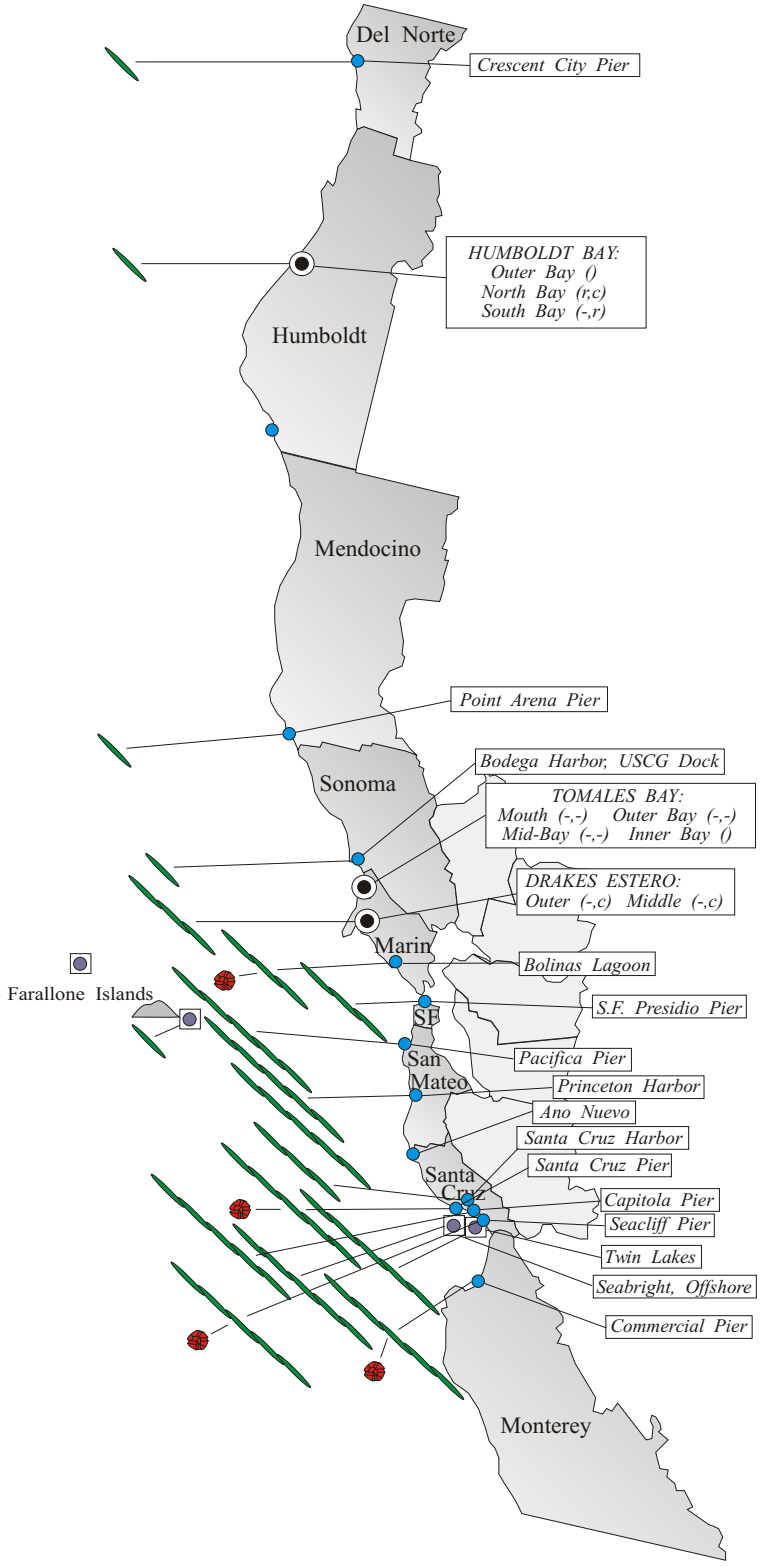


Figure 2. Distribution of toxin-producing phytoplankton in Northern California during November, 2009.



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Low concentrations of the PSP toxins were detected in shellfish samples collected from Morro Bay during the first three weeks of the month.

Domoic Acid

Pseudo-nitzschia was detected at many locations covering most southern California coastal counties during November (Figure 1). The high relative abundances observed along the San Luis Obispo coast in September and October declined somewhat in November. This diatom increased significantly at some Santa Barbara locations, all of which were offshore sites. *Pseudo-nitzschia* was also observed at sites in Ventura, Los Angeles, and San Diego counties, representing an increase in distribution compared to observations in October.

Low levels of domoic acid were detected in shellfish samples collected from two locations in Morro Bay during the first and last weeks of the month (Figure 3). The highest concentration detected was 10 ppm in a sentinel mussel sample. A mussel sample from the Port Hueneme breakwater (Ventura County) contained 11 ppm of domoic acid on November 25.

Non-toxic Species

Dinoflagellates dominated the phytoplankton assemblage along the southern California

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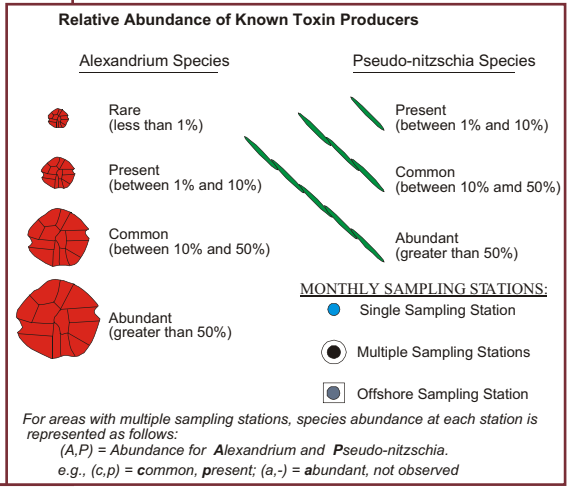
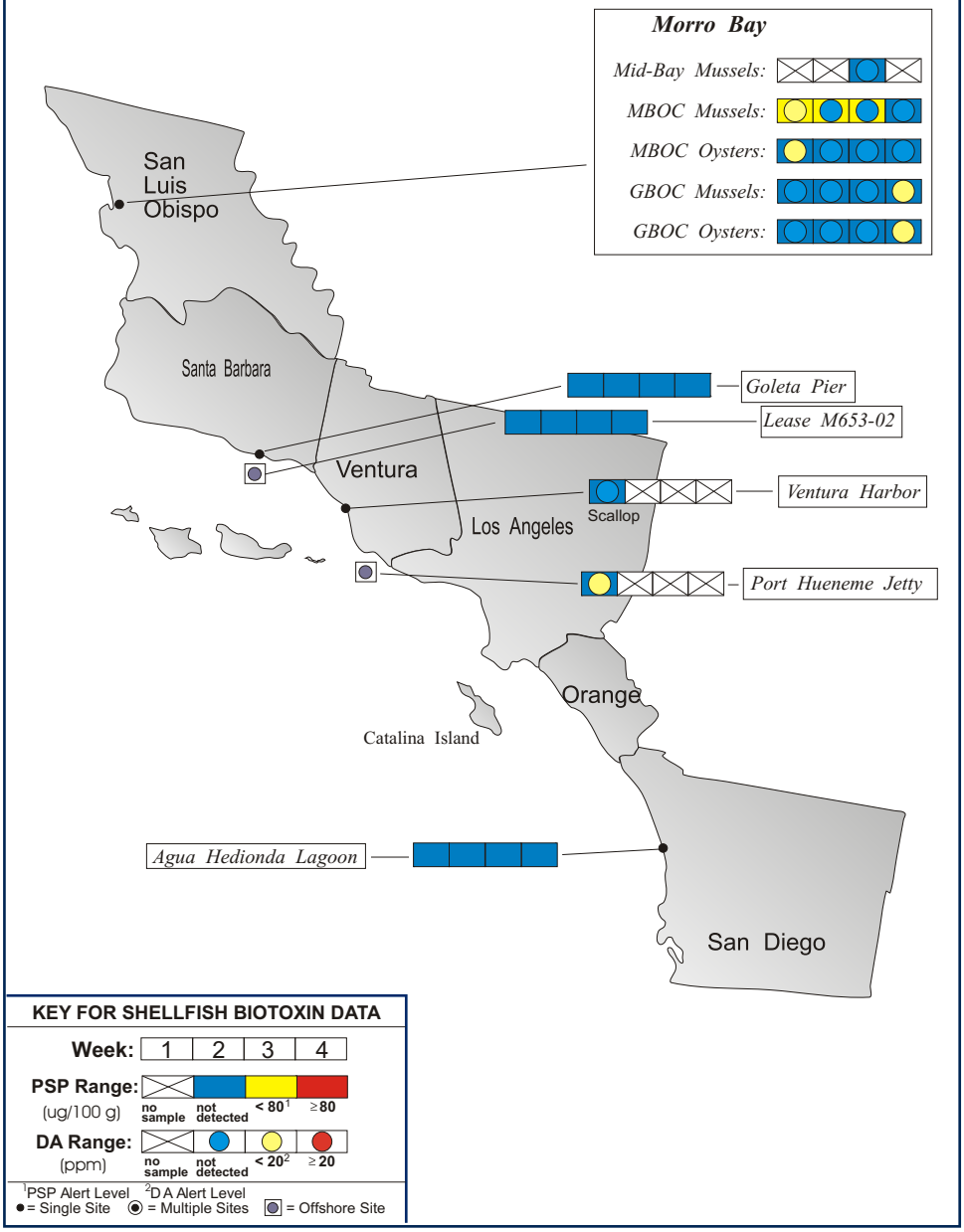


Figure 3. Distribution of shellfish biotoxins in Southern California during November, 2009.



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coast. The most abundant species continued to be *Lingulodinium polyedrum*, *Ceratium furca*, and *Prorocentrum micans*.

Northern California Summary:

Paralytic Shellfish Poisoning

Low numbers of *Alexandrium* continued to be observed at sites in Marin, Santa Cruz, and Monterey counties in November (Figure 2). These observations represent a decrease in distribution compared to observations in October.

PSP toxins were detected in shellfish samples from Del Norte, Humboldt, and Santa Cruz counties (Figure 4). The highest concentrations detected were in Del Norte County on November 2 (114 ug/100g), declining below the alert level by the third week of November.

Domoic Acid

Pseudo-nitzschia was observed at most sampling locations in November (Figure 2). The high relative abundance of this diatom observed at sites inside Monterey Bay in October persisted into November. The relative abundance of *Pseudo-nitzschia* increased at nearshore sites along the San Mateo coast.

Domoic acid concentrations exceeded the

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The Marine Biotoxin Monitoring and Control Program, managed by the California Department of Public Health, is a state-wide effort involving a consortium of volunteer participants. The shellfish sampling and analysis element of this program is intended to provide an early warning of shellfish toxicity by routinely assessing coastal resources for the presence of paralytic shellfish poisoning (PSP) toxins and domoic acid.

The Phytoplankton Monitoring Program is a state-wide effort designed to detect toxin producing species of phytoplankton in ocean water before they impact the public. The phytoplankton monitoring and observation effort can provide an advanced warning of a potential toxic bloom, allowing us to focus sampling efforts in the affected area before California's valuable shellfish resources or the public health is threatened.

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(510) 412-4635

For Recorded Biotoxin Information Call:
(800) 553 - 4133

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alert level on November 3 (21 ppm) in sentinel mussels collected by U.C. Santa Cruz at the Santa Cruz Pier. A mussel sample collected on this same date by the Santa Cruz County Environmental Health Department at Natural Bridges contained 17 ppm of domoic acid. By the second week of the month the toxin level declined below the alert level at Santa Cruz Pier, but increased again by the third week of the month, reaching 59 ppm on November 20. Domoic acid concentrations at this site declined below the detection limit by November 25. A mussel sample collected on November 12 at Pescadero State Beach by the San Mateo County Environmental Health Department contained 6 ppm of domoic acid.

Non-toxic Species

Diatoms dominated the northern California coast in November. *Chaetoceros* was the most abundant genera observed. The dinoflagellates *Ceratium divaricatum and C. furca* were common at several locations during the first two weeks of the month.

QUARANTINES:

The annual mussel quarantine extension remained in effect for Del Norte, Humboldt, and San Luis Obispo counties due to elevated toxin levels in these regions. The health advisory issued in October for Santa Cruz County as a result of high concentrations of domoic acid also remained in effect. There were no quarantines or health advisories in place for the remainder of the coastal counties in November.

The annual quarantine goes into effect each year on May 1 and applies

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Figure 4. Distribution of shellfish biotoxins in Northern California during November, 2009.

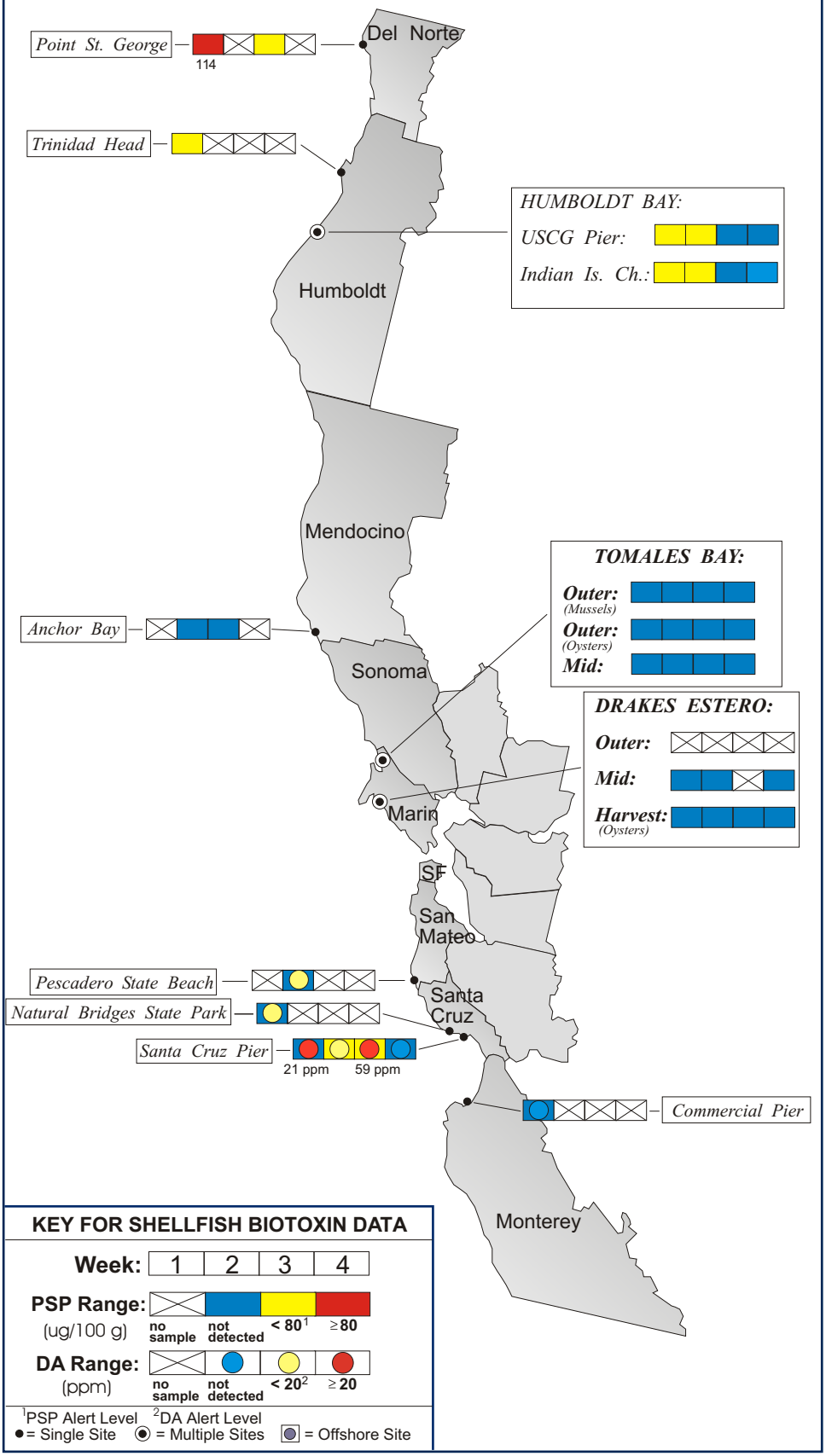


Table 1. California Marine Biotoxin Monitoring Program participants submitting shellfish samples during November, 2009.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	2
Humboldt	Coast Seafood Company	8
	Humboldt County Environmental Health Department	1
Mendocino	CDPH Volunteer (*Marie De Santis*)	2
Sonoma	None Submitted	
Marin	Cove Mussel Company	3
	Drakes Bay Oyster Company	16
	Hog Island Oyster Company	4
	Marin Oyster Company	2
San Francisco	None Submitted	
San Mateo	San Mateo County Environmental Health Department	1
Santa Cruz	U.C. Santa Cruz	4
	Santa Cruz County Environmental Health Department	1
Monterey	Monterey Abalone Company	1
San Luis Obispo	Grassy Bar Oyster Co.	11
	Morro Bay Oyster Company	8
Santa Barbara	Santa Barbara Mariculture Company	8
	U.C. Santa Barbara	4
Ventura	CDPH Volunteer (*Bill Weinerth*)	2
Los Angeles	None Submitted	
Orange	None Submitted	
San Diego	Carlsbad Aquafarms, Inc.	4

specifically to the sport-harvesting of mussels along the entire California coastline, including all bays and estuaries. Routine phytoplankton and biotoxin monitoring is maintained throughout the year. This allows the detection of unexpected increases in biotoxin activity outside of the routine quarantine period. The annual quarantine does not apply to the certified commercial shellfish growing areas in California, which are monitored intensively throughout the year. All certified shellfish growers are required to submit at least weekly samples of shellfish for toxin monitoring. Harvest restrictions or closures are implemented as needed to protect the public's health.

Consumers of Washington clams, also known as butter clams (*Saxidomus nuttalli*), are cautioned to eat only the white meat. Washington clams can concentrate the PSP toxins in the viscera and in the dark parts of the siphon and can remain toxic for a long period of time. Persons taking scallops or clams, with the exception of razor clams, are advised to remove and discard the dark parts (i.e., the digestive organs or viscera). Razor clams (*Siliqua patula*) are an exception to this general guidance due to their ability to concentrate and retain domoic acid in the edible white meat as well as in the viscera.

PSP toxins affect the human central nervous system, producing a tingling around the mouth and fingertips within a few minutes to a few hours after eating toxic shellfish. These symptoms typically are followed by disturbed balance, lack of muscular coordination, slurred speech and difficulty swallowing. In severe poisonings, complete muscular paralysis and death from asphyxiation can occur.

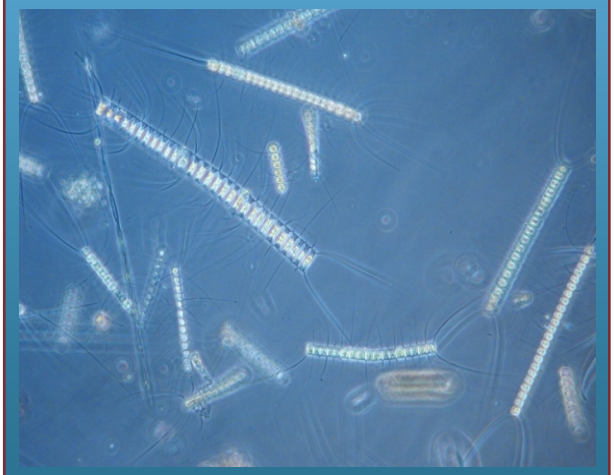
Symptoms of domoic acid poisoning can occur within 30 minutes to 24 hours after eating toxic seafood. In mild cases, symptoms of exposure to this nerve toxin may include vomiting, diarrhea, abdominal cramps, headache and dizziness. These symptoms disappear completely within several days. In severe cases, the victim may experience excessive bronchial secretions, difficulty breathing, confusion, disorientation, cardiovascular instability, seizures, permanent loss of short-term memory, coma and death.

Any person experiencing any of these symptoms should seek immediate medical care. Consumers are also advised that neither cooking or freezing eliminates domoic acid or the PSP toxins from the shellfish tissue. These toxins may also accumulate in the viscera of other seafood species such as crab, lobster, and small finfish like sardines and anchovies, therefore these tissues should not be consumed. Sport harvesters are encouraged to contact the "Biotoxin Information Line" at 1-800-553-4133 for a current update on marine biotoxin activity prior to gathering and consuming shellfish.

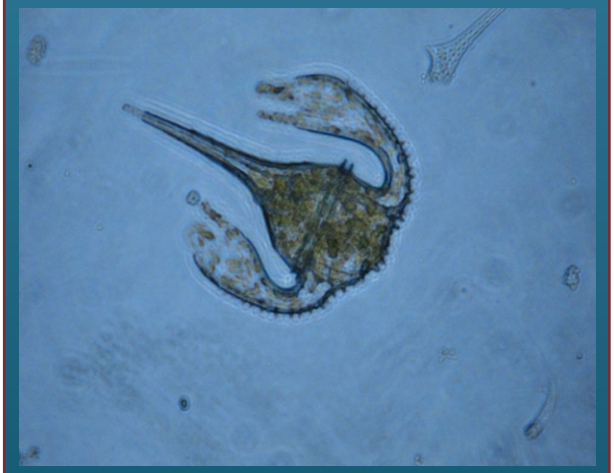
Table 2. Agencies, organizations and volunteers participating in marine phytoplankton sample collection during November, 2009.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	1
Humboldt	Coast Seafood Company	4
	Bureau of Land Management	1
Mendocino	CDPH Volunteer (*Marie De Santis*)	2
Sonoma	CDPH Volunteer (*Cathleen Cannon*)	1
Marin	CDPH Volunteers *(Brent Anderson, Cal Strobel)*	5
	Drakes Bay Oyster Company	9
	Hog Island Oyster Company	2
San Francisco	CDPH Volunteer (*E. McNaughton*)	2
San Mateo	CDPH Volunteer (*Kathleen Abadie*)	2
	San Mateo County Environmental Health Dept.	2
	The Marine Mammal Center (*Stan Jensen*)	4
	U.C. Santa Cruz	2
Santa Cruz	San Lorenzo Valley High School	2
	The Marine Mammal Center (*Nancy Scarborough*)	1
	Santa Cruz County Environmental Health Dept.	6
	U.C. Santa Cruz	3
Monterey	Monterey Abalone Company	2
	CDPH Volunteer (*Jerry Norton*)	1
San Luis Obispo	CDPH Volunteer (*Renee and Auburn Atkins*)	1
	Friends of the Sea Otter	5
	Morro Bay National Estuary Program	2
	Monterey Bay National Marine Sanctuary	3
	Morro Bay Oyster Company	3
	Tenera Environmental	1
	The Marine Mammal Center (*Tim Lytsell*)	6
Santa Barbara	CDPH Volunteer (*Sylvia Short*)	4
	Channel Islands National Marine Sanctuary	4
	Santa Barbara Mariculture Company	3
	U.C. Santa Barbara	4
Ventura	CDPH Volunteer (*Fred Burgess*)	3
	Channel Islands National Marine Sanctuary	2
Los Angeles	Catalina Island Marine Institute	1
	City of Los Angeles Environmental Monitoring Div.	3
	Los Angeles County Sanitation District	3
	Southern California Marine Institute	1
Orange	California Department of Fish and Game	2
	Ocean Institute	1
San Diego	Avian Research Associates	1
	Carlsbad Aquafarms, Inc.	1
	Scripps Institute of Oceanography	5

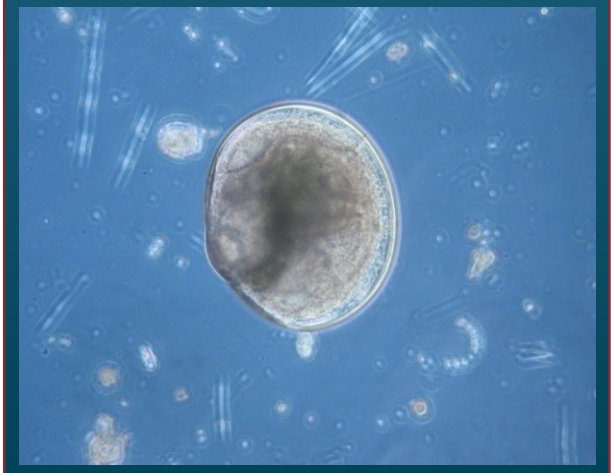
PHYTOPLANKTON GALLERY



The diatom Chaetoceros remained the most common genera along the northern California coast.



A 'new' species of Ceratium, possibly C. platycorne, was observed for the first time by our program in a sample from Monterey Bay.



Larval and juvenile bivalve shellfish are occasionally observed in our phytoplankton samples.